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Changes in Average Size of Agricultural Holding 1960-1967 and Changes of Livestock

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Data in the successive volumes of Agricultural Statistics (HMSO) enable the average acreage of holdings to be found on a county basis. Plotting of these average sizes, for crops and grass alone, on a map shows distinct regional groupings. The smallest farms or holdings lie on an arc, (sometimes called the Celtic fringe) from the West Riding of Yorkshire and Derby to Cornwall, including all of Wales except Brecon and Radnor. The counties with the largest average size lie in a belt from the East Riding of Yorkshire to Dorset, plus Northumberland and Suffolk. The remainder of moderate size lie in two areas, Nottingham to Devon and south-east England plus Norfolk. There are, however, three areas or enclaves of smaller average holding size namely - Worcester; Holland, Isle of Ely and Cambridge; Middlesex and Surrey. Each of these small areas are known to be zones where there is a considerable proportion of intensive cultivations in small-sized holdings.

Putting aside these geographically anomalous enclaves, the other counties can be divided in order of magnitude of average size of holding into six categories, and the changes in numbers of holdings from 1960 to 1967 are seen to be

Category	Range of size in acres	Number of holdings (1000s) 1960	1967	Percentage change	Effective Transpiration
Very Large	176-131	20.21	17.25	-14½	14.40
Large	124-104	39.20	33.24	-15	14.10
Large Medium	98-86	78.61	67.91	-13½	14.55
Small Medium	82-72	65.38	58.10	-11½	15.25
Small	65-59	51.57	45.57	-11½	15.40
Very Small	56-35	66.71	58.96	-11½	16.10

The relative change in the number of holdings is roughly the same, although slightly greater in the counties of larger average farms. It therefore follows that the increase in holding size is increasing more in the large farm areas.

Using the milk herd and total cattle data from Agricultural Statistics, it also is clear that these are increasing most in the small farm areas. These increases have already been shown to be closely related to the effective transpiration (or weather factor). The corresponding link between weather and farm size is not so clear, because large farms can be engaged in either sheep farming or arable farming. These changes can be summarized as follows for holdings excluding rough grazing:-

/Category

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Category	Average Size 1967 (acres)	Change 1960-67	1967 Milk herd per 100 acres	Change 1959-67	1967 Cattle per 100 acres	Change 1959-67
Very Large	149	+22	8.3	-0.4	31.1	-1.2
Large	116	+18	7.9	-0.2	23.4	-1.2
Large Medium	93	+12	11.1	+0.4	33.8	+1.4
Small Medium	77	+ 8	16.2	+1.7	42.4	+3.6
Small	63	+ 7	19.1	+2.7	46.8	+6.8
Very Small	51	+ 6	23.0	+2.7	54.5	+8.2

Details for individual counties are given in Table 1 of the Appendix.

If this process is repeated for holdings in which the rough grazing is included, the following figures are obtained

Category	Range of size in acres	Number of holdings (1000s) 1960	1967	Percentage Change	Effective Transpiration
Very Large	268-138	25.15	21.67	-14	14.55
Large	129-117	38.23	32.79	-14	14.35
Large Medium	111-94	72.49	62.25	-14	14.35
Small Medium	92-81	70.26	62.13	-11½	15.15
Small	78-65	72.67	64.44	-11½	15.40
Very Small	63-47	48.61	42.79	-12	16.15

The accompanying changes in animal husbandry must now take into account the sheep population, so taking 7 sheep as equivalent to 1 cow and ignoring the age of the animals (allowance for lambs and calves makes little difference to the relative picture), we find:-

Category	Average Size 1967 (acres)	Change 1960-67	1967 Total Stock per 100 acres	Change 1959-67	Change Milk Herd per 100 acres	Change in Sheep per 100 acres
Very Large	170	+22	38.4	+0.6	-0.1	+2.0
Large	123	+18	34.7	+0.8	0.0	+1.8
Large Medium	101	+13	34.8	+1.2	+0.1	+3.7
Small Medium	84	+ 9	50.1	+4.8	+1.6	+9.5
Small	73	+ 7	52.2	+7.2	+2.0	+12.0
Very Small	56	+ 6	60.0	+9.1	+3.2	+9.2

Details for individual counties are given in Table 2 of the Appendix.

The close relationship between average farm size and animal husbandry is still apparent, but before the matter can be taken further, two influences have to be resolved. Firstly the areas with holdings of large average size can either be suitable for grass growth, such as Westmoreland, or suitable for cereals such as Kesteven. The categories should therefore be subdivided in accordance with their average effective transpiration, the dividing line was taken as 14.5 inches; those counties with this average or below are marked with a circle (o) in Table 2. Secondly much of the sheep are run on common rough grazing in certain counties, therefore division of stock numbers by the only acreage included in the holdings is inconsistent. In the following tables the phrase "total acres" implies the inclusion of common land.

/Counties

Counties with above average effective transpirations (A)

Category	Average size 1967 (acres)	Change 1960-67	Change per 100 total acres 1959-67				Effective Transpiration
			Total Stock	Cattle	Milk Herd	Sheep	
Very Large (A)	181	+20	+2.3	+1.5	0.0	+ 4.3	14.95
Large (A)	128	+11	+7.4	+5.6	+1.1	+12.0	15.50
Large Medium (A)	104	+12	+3.9	+2.6	+0.6	+ 9.0	14.95
Small Medium (A)	83	+ 7	+6.0	+4.1	+2.0	+13.1	15.55
Small (A)	73	+ 7	+6.7	+5.1	+1.8	+11.1	15.40
Very Small (A)	56	+ 6	+8.6	+7.2	+3.1	+ 8.7	16.15

Counties with below average effective transpiration (B)

Category	Average size 1967 (acres)	Change 1960-67	Change per 100 total acres 1959-67				Effective Transpiration
			Total Stock	Cattle	Milk Herd	Sheep	
Vary Large (B)	153	+23	-3.0	-2.7	-0.2	-2.4	14.00
Large (B)	121	+20	-2.7	-2.1	-0.6	-3.4	13.80
Large Medium (B)	98	+13	-1.6	-1.1	-0.5	-2.1	13.85
Small Medium (B)	86	+11	+1.0	+1.0	+0.5	+0.1	14.25

(There are no counties with below average effective transpiration in the small and 'very small' categories)

The closeness of the relationship appears to have decreased, but the explanation lies in the last column (effective transpiration). There are clearly two influences on the selection of animal husbandry as a way of farming, namely the climatic suitability for grass and the size of the farm.

Any comments or suggestions on this paper should be referred to the Author.

Meteorological Office
Bracknell
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Appendix

Table 1. Average size of holdings of crops and grass and changes in milk herd and in cattle herd

		1967 Average holding	Change 1960-67	1967 Average holding	Change 1960-67	1967 Milk herd per 100 acres	Change 1959-67	1967 Cattle Herd per 100 acres	Change 1959-67
Very Large	Rutland	176	+23			2.4	+0.1	23.8	-2.4
	Kesteven	162	+25			2.9	+0.2	15.5	-2.6
	Northumberland	162	+23			4.2	-0.7	40.9	+2.0
	Northampton	153	+25	149	+22	5.9	-0.5	28.0	-3.1
	Oxford	140	+19			8.1	-0.6	27.7	-2.4
	Wiltshire	131	+20			18.4	-0.4	37.0	-1.0
Large	East Riding	124	+15			4.8	+0.2	21.3	-1.3
	Berkshire	123	+21			11.1	-1.7	27.8	-2.2
	Lindsey	120	+22			2.9	0.0	17.3	-2.4
	Huntingdon	118	+17			2.5	-0.8	11.2	-3.3
	Suffolk	116	+20	116	+18	5.1	-1.1	15.8	-1.9
	Hertford	111	+16			7.5	-0.5	21.5	-1.7
	Dorset	105	+13			25.0	+2.2	46.4	+4.1
	Buckingham	104	+15			10.5	+0.1	34.3	+0.1
Large Medium	Essex	98	+16			5.4	-1.0	15.7	-2.0
	Leicester	98	+10			12.2	+0.3	40.8	+1.6
	Nottingham	95	+13			8.3	+0.6	28.5	+0.2
	Norfolk	94	+11			5.3	-1.0	17.4	-2.6
	Warwick	94	+10			12.0	+1.1	34.5	+1.4
	Radnor	94	+12			1.4	-0.9	40.4	+8.0
	Hampshire	93	+18	93	+12	14.8	-0.5	31.9	-0.3
	Bedford	93	+14			3.8	-0.9	17.5	-1.0
	North Riding	92	+10			11.2	+1.2	40.3	+3.9
	Westmoreland	90	+8			22.7	+1.3	63.3	+9.3
	Cumberland	89	+9			24.4	+4.1	67.8	+11.3
	Durham	87	+9			10.3	0.0	38.2	+2.2
	Gloucester	86	+10			14.4	+0.6	36.2	+0.2
Small Medium	Kent	82	+13			6.4	-0.6	19.8	-0.9
	Sussex	82	+11			16.6	+0.9	38.8	+2.4
	Brecon	82	+9			4.5	-2.0	42.1	+6.3
	Isle of Wight	81	+10			22.6	-0.3	44.2	0.0
	Shropshire	80	+10	77	+8	18.7	+1.3	49.0	+4.4
	Hereford	80	+8			7.5	+0.8	39.8	+1.9
	Devon	74	+6			17.5	+4.0	48.0	+6.7
	Somerset	72	+6			26.0	+2.4	50.7	+4.0
Small	Pembroke	65	+6			23.0	+4.2	55.1	+8.6
	Stafford	65	+7			26.1	+3.5	53.2	+6.7
	West Riding	64	+8			15.4	+1.8	40.7	+6.5
	Montgomery	63	+8	63	+7	12.2	+0.8	51.6	+7.6
	Denbigh	60	+9			17.9	+1.0	52.0	+5.5
	Monmouth	60	+6			14.6	+1.9	45.1	+5.8
	Derby	59	+5			23.8	+2.9	53.9	+9.9
Very Small	Cheshire	56	+5			36.7	+5.9	61.1	+9.5
	Carmarthen	55	+4			24.6	+3.5	50.3	+7.4
	Glamorgan	55	+6			14.7	+0.5	48.7	+8.8
	Cornwall	55	+7			19.6	+2.9	55.6	+7.5
	Cardigan	54	+5	51	+6	18.8	+2.3	46.1	+8.1
	Merioneth	53	+7			7.2	-0.4	46.4	+5.2
	Lancashire	46	+5			26.3	+4.1	55.1	+9.6
	Flint	46	+4			29.2	+4.5	64.3	+9.1
	Anglesey	43	+4			10.5	-0.6	54.5	+5.0
	Caernarvon	35	+6			13.3	-1.7	59.4	+7.2
Intensive Farming	Cambridge	75	+9			1.4	-0.5	8.3	-2.0
	Worcester	58	+7			9.8	+0.5	33.4	+1.2
	Holland	56	+10	62	+7	3.3	-3.0	6.7	-4.2
	Surrey	56	+6			17.2	+1.4	39.0	+4.6
	Middlesex	50	+8			10.6	+1.7	27.1	-0.2

Table 2. Average size of holdings of crops and grass and rough grazing and change in total stock and in sheep herd

		1967 Average holding	Change 1960-67	1967 Total stock per 100 acres	Change 1959-67	1967 Sheep herd per 100 acres	Change 1959-67
Very Large	Northumberland	268	+30	39.6	+1.8	107	0.0
	o Rutland	174	+21	34.9	-1.2	77	0.0
	Merioneth	167	+20	43.0	+5.0	200	+21.6
	o Kesteven	160	+23	19.6	-2.9	29	-1.4
	o Northampton	153	+25	38.4	-4.2	74	-6.9
	o Oxford	141	+19	33.2	-1.9	40	+1.0
	Wiltshire	141	+18	36.9	+0.5	20	+4.0
	Westmorland	138	+10	64.0	+6.7	166	+6.4
Large	Radnor	129	+16	69.7	+13.4	284	+53.1
	Cumberland	128	+12	60.0	+7.1	96	-7.9
	Brecon	126	+5	69.4	+11.9	296	+41.3
	o East Riding	126	+16	24.1	-2.3	57	-6.1
	o Berkshire	123	+21	29.8	-1.4	19	+4.4
	o Lindsey	119	+21	18.5	-6.4	34	-2.4
	o Huntingdon	118	+18	12.7	-4.6	12	-8.9
	o Suffolk	117	+20	16.8	-1.9	9	-3.7
Large Medium	Dorset	111	+13	46.4	+4.9	24	+7.7
	North Riding	111	+11	46.1	+4.1	92	+5.4
	o Hertford	109	+15	23.1	-1.6	13	-1.7
	o Buckingham	104	+15	40.7	-0.3	47	-2.7
	Montgomery	102	+10	60.2	+11.4	199	+40.4
	Durham	100	+10	43.9	+2.9	80	+5.1
	o Leicester	98	+10	46.4	-0.9	56	-1.8
	o Essex	97	+16	16.8	-2.3	11	-2.2
	o Norfolk	96	+11	18.7	-2.6	7	-1.4
	o Bedford	94	+15	20.4	-0.6	15	-4.4
	Hampshire	94	+18	33.6	-0.9	17	+2.3
	o Nottingham	94	+13	32.1	-0.4	27	-3.1
Small Medium	o Warwick	92	+8	42.6	+0.4	60	-5.3
	Isle of Wight	89	+10	41.8	+0.3	13	-3.7
	Gloucester	87	+10	43.5	+1.0	56	+4.0
	o Sussex	85	+12	44.0	+3.8	48	+7.6
	Shropshire	83	+9	59.8	+5.8	89	+8.3
	o Kent	82	+12	33.9	-1.3	104	-1.9
	Cardigan	82	+5	48.2	+10.8	131	+33.3
	Devon	82	+6	58.3	+8.8	109	+16.5
	Hereford	81	+8	59.6	+4.1	146	+14.0
Small	West Riding	78	+10	41.7	+4.0	69	+4.4
	Glamorgan	78	+5	44.0	+3.1	130	+25.3
	Denbigh	77	+7	69.6	+12.4	213	+49.4
	Pembroke	75	+7	55.6	+9.0	53	+6.2
	Somerset	75	+6	55.4	+4.8	52	+4.2
	Caernarvon	74	+13	52.5	+6.9	177	+27.2
	Derby	69	+5	51.4	+9.1	45	+8.0
	Carmarthen	66	+4	55.4	+10.5	95	+16.2
	Stafford	65	+5	56.0	+7.5	32	-2.2
Very Small	Monmouth	63	+5	63.2	+8.1	153	+11.7
	Cornwall	60	+7	59.4	+9.0	54	+11.3
	Cheshire	58	+4	60.4	+9.4	21	+0.9
	Lancashire	53	+6	55.5	+9.0	67	+8.5
	Flint	49	+4	74.3	+13.3	105	+17.3
	Anglesey	47	+3	67.2	+7.0	131	+17.0
Intensive Farming	o Cambridge	75	+9	9.0	-2.5	6	-3.7
	Worcester	58	+7	44.0	+2.7	78	+10.1
	o Holland	57	+8	7.8	-3.8	8	+2.4
	o Surrey	56	+7	41.0	+5.5	19	+4.0
	o Middlesex	51	+7	26.0	-1.0	10	-0.3